The effect of *Candida albicans*, *Actinomyces naeslundii* and *Streptococcus mutans* biofilm effluent on the expression of interleukin-6 and interleukin-8 from normal and oral cancer cell lines

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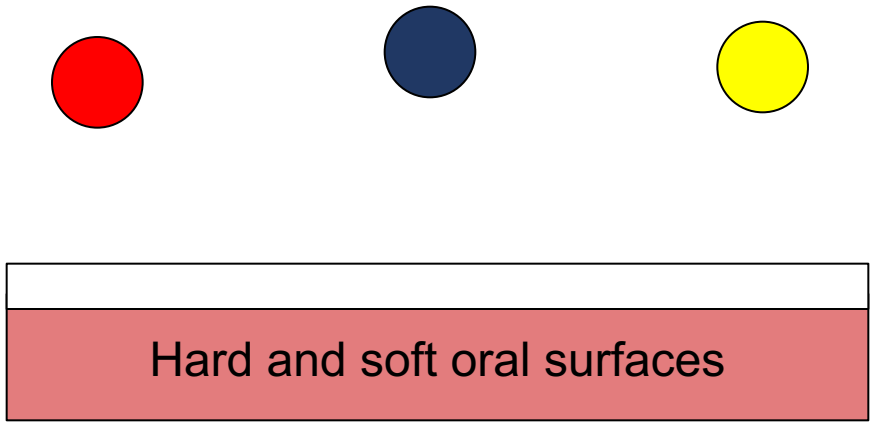
Oral cancer

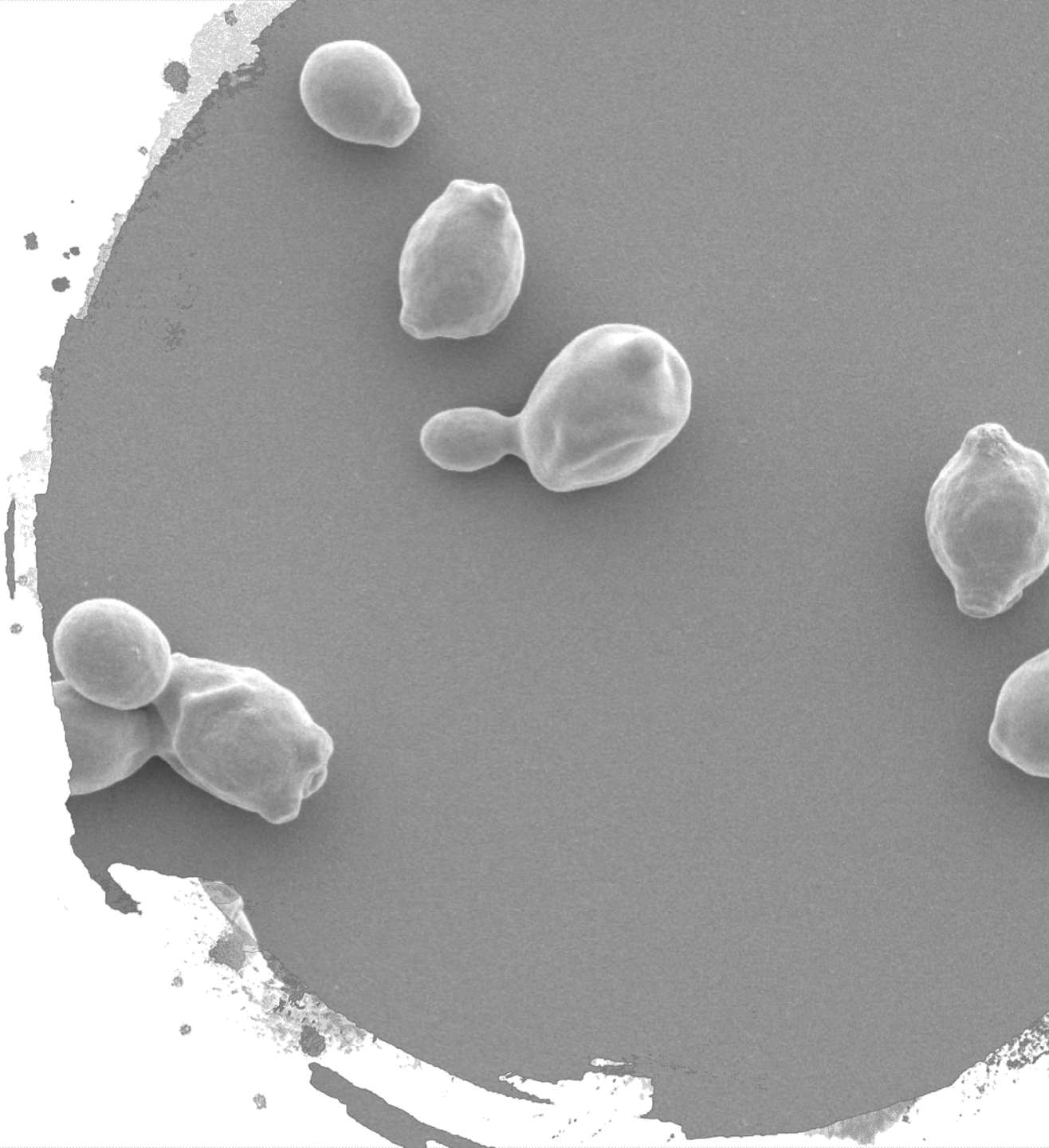
- The sixth most common cancer worldwide
- Oral squamous cell carcinoma (OSCC) is the most common oral cancer
- The etiology of oral cancer include:
  - Alcohol consumption
  - Tobacco smoking
  - Microbial infection



Polymicrobial biofilms: Ability of genetically distinct microorganisms to form biofilms on oral substrata

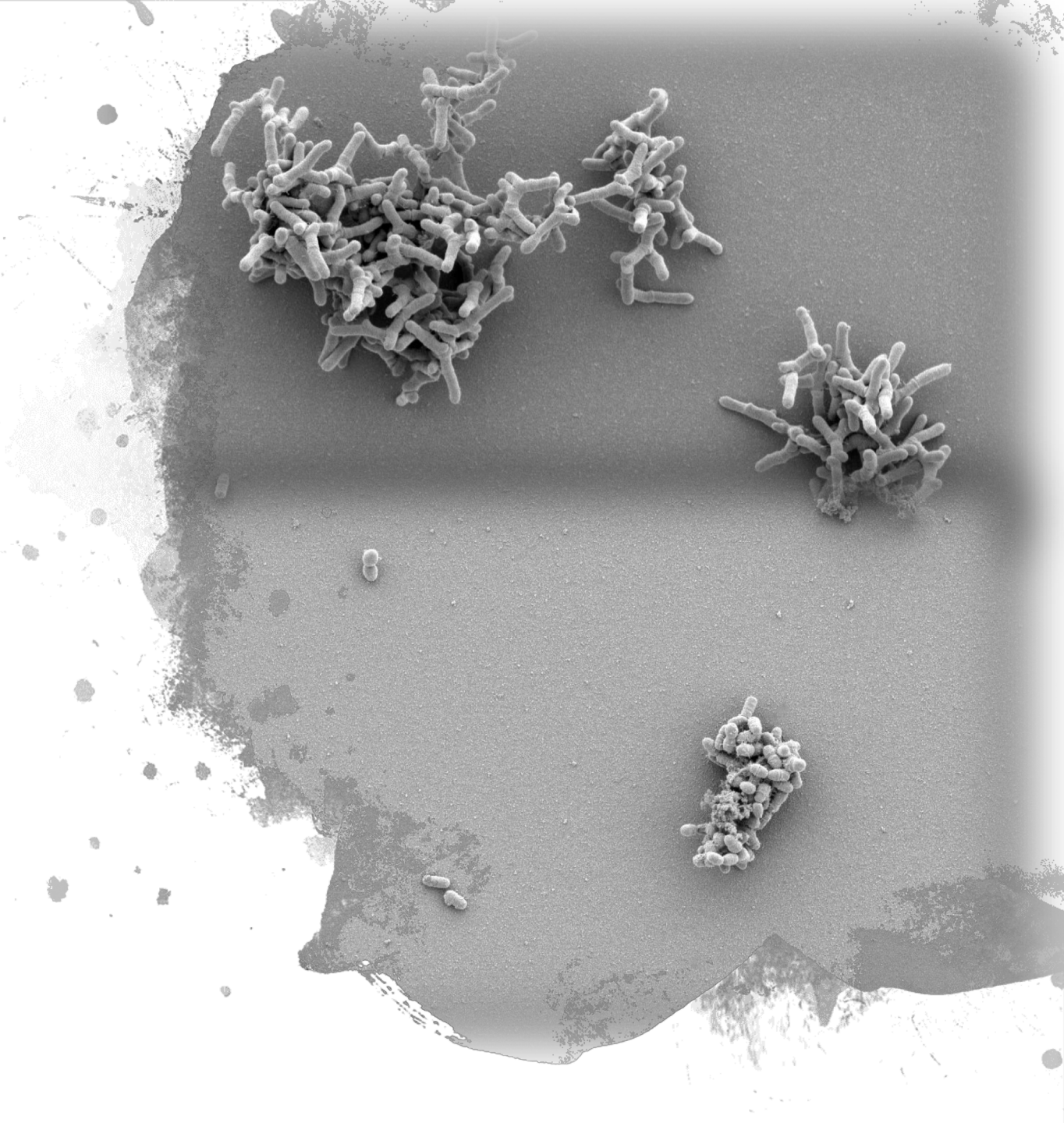
Candida albicans

- Facultative anaerobic microorganisms
- Frequently isolated from OSCC site
- *Candida albicans* alcohol dehydrogenases enzyme (*CaADH*)
- Virulence factors:
  - Phenotypic switching
  - Dimorphism
  - Candidalysin
  - Biofilm forming ability



Other microorganisms

- *Actinomyces naeslundii*
  - Oral microbiome
  - Gram positive bacilli
  - Facultative anaerobic microorganisms
  - Primary oral coloniser
- *Streptococcus mutans*
  - Gram positive cocci
  - Facultative anaerobic microorganisms
  - Secondary oral coloniser
  - Caries development
  - Proliferate in disrupted mucosa in neutropenic patient with cancer



Objective

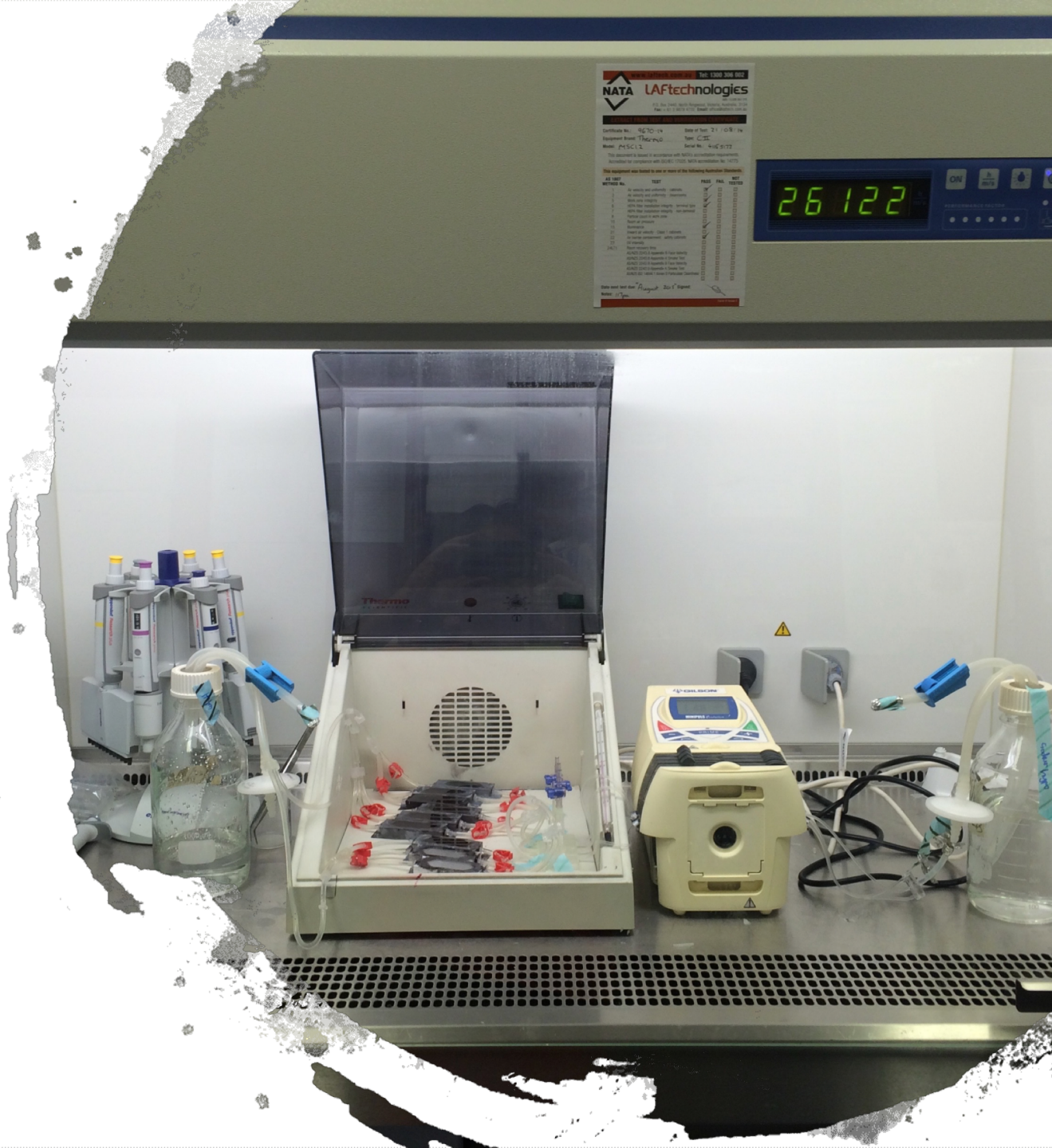
To determine the effect of mono-culture and polymicrobial biofilms effluent from *C. albicans*, *Streptococcus mutans* and *Actinomyces naeslundii* to the expression of Interleukin-6 and Interleukin-8 from normal and oral squamous cell carcinoma (OSCC) cell lines

Hypothesis

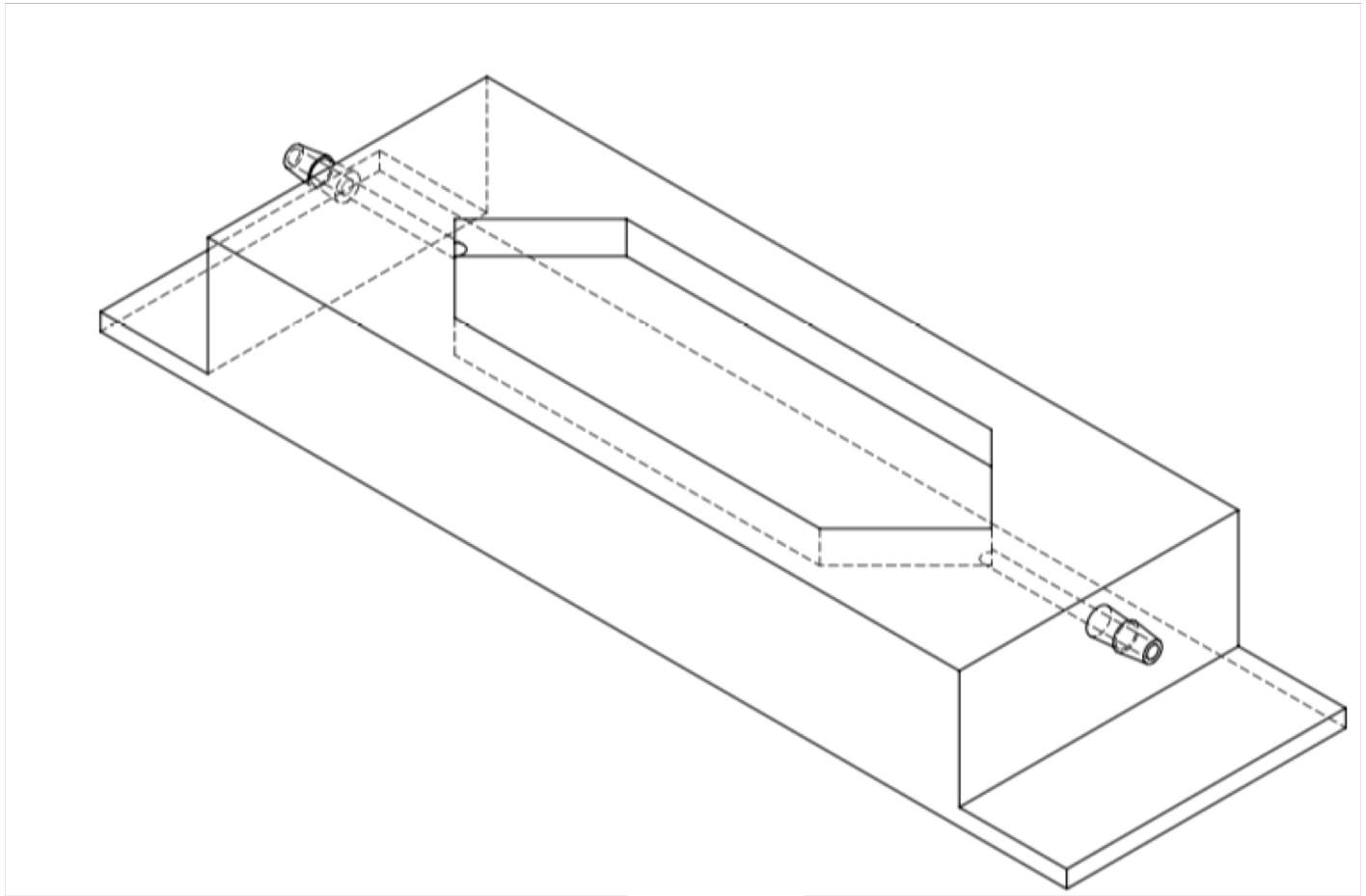
Biofilm effluent promote oral carcinogenesis

Methodology

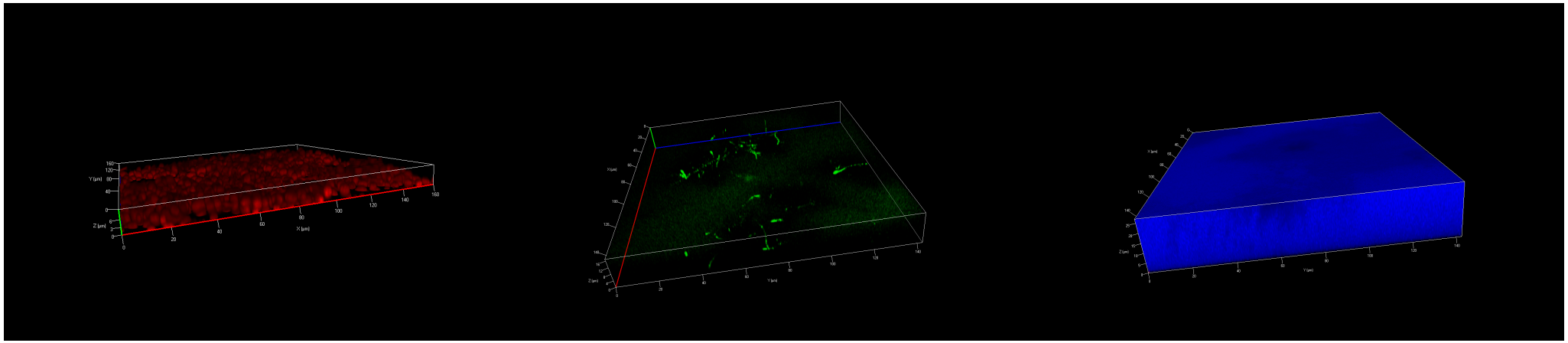
- Oral cancer isolate *C. albicans* (ALC3), *A. naeslundii* (NCTC 10301) and *S. mutans* (Ingbritt)
- Biofilm formation (3 mL/h for 24 h)
  - Artificial saliva medium
  - Yeast form
- Confirmation of biofilm using CLSM
  - FISH
- Collection of effluent
- Preparation of conditioned medium and incubation with OKF6 and H357 cell lines (2 h and 24 h)
- Bioplex



Flow cell system (Patented)

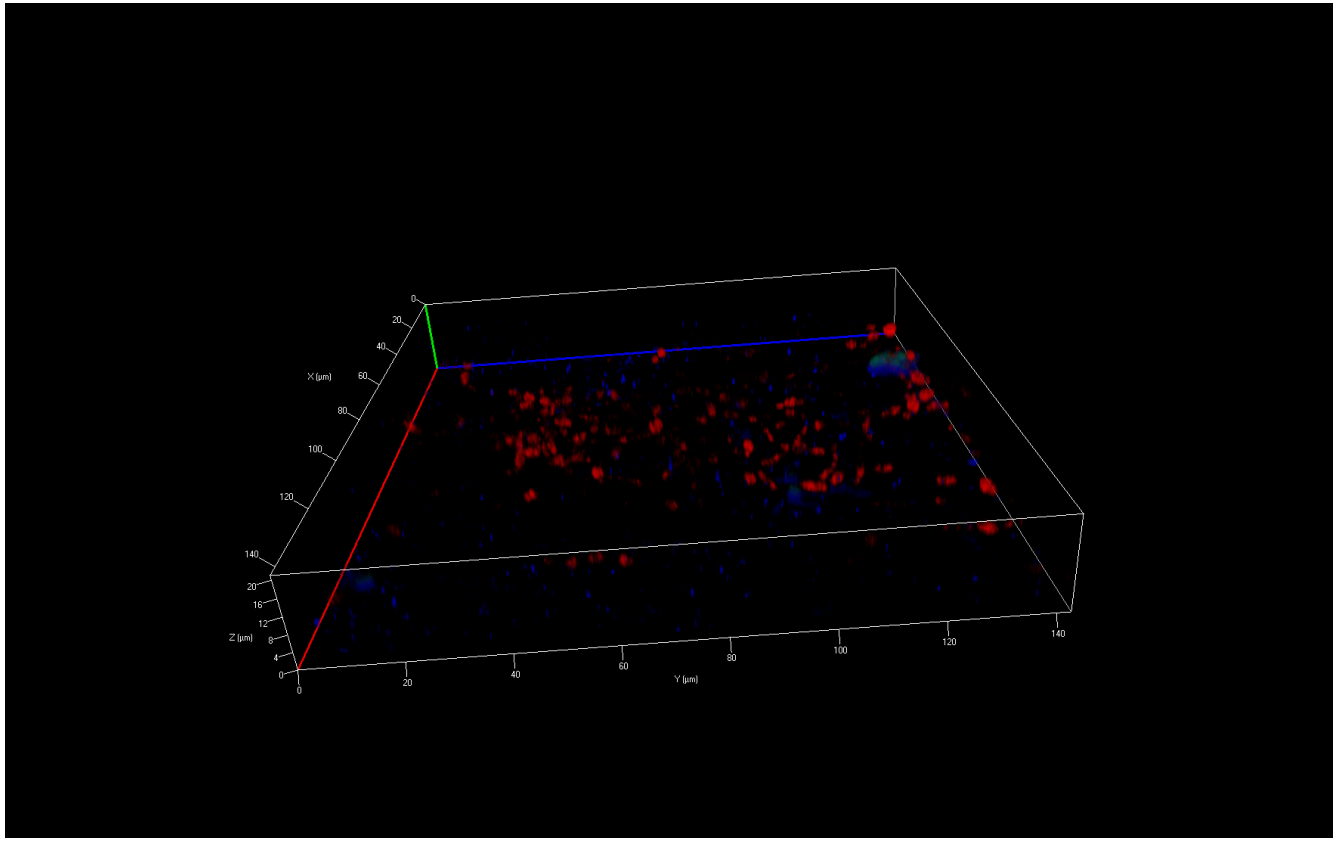


Results and Discussion



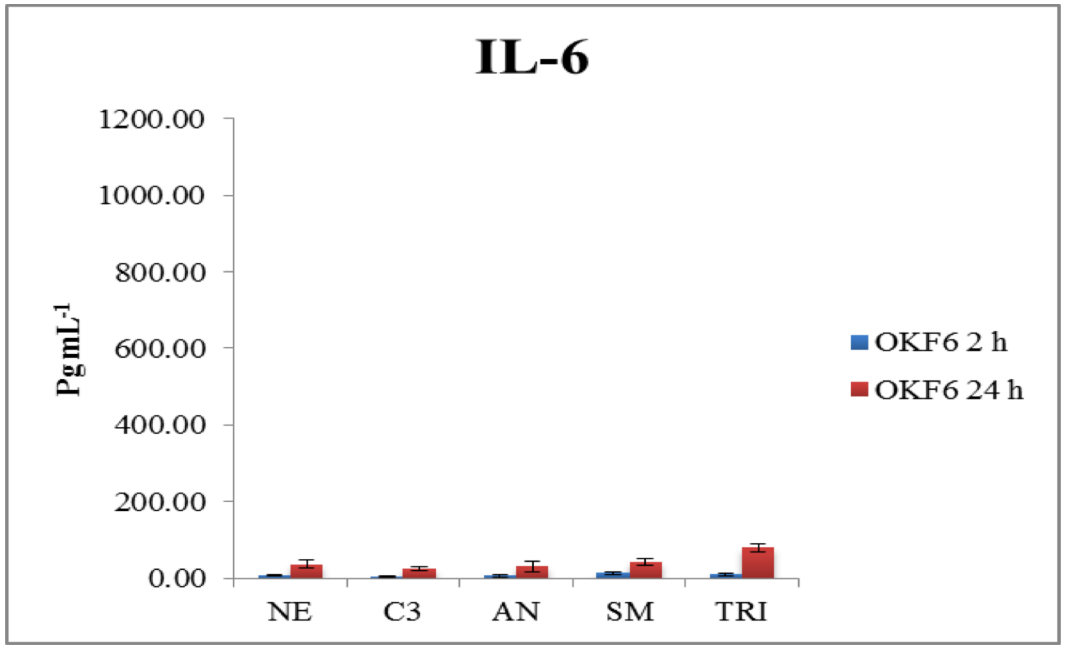
From left: *C. albicans, A. naeslundii* and *S. mutans*

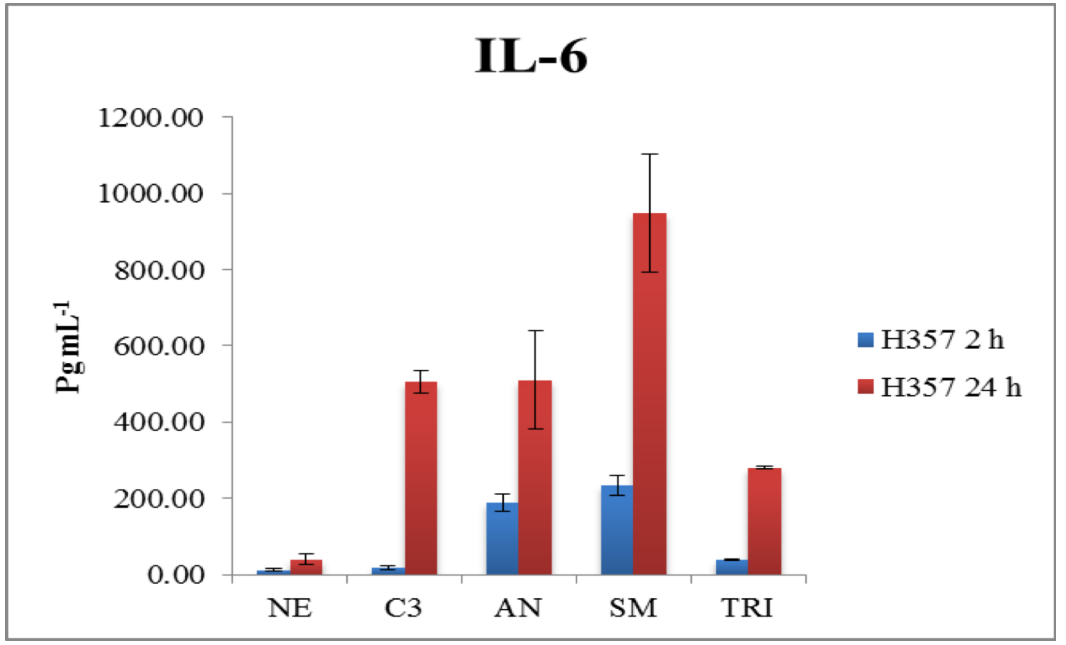
Results and Discussion



Polymicrobial biofilms

Results and Discussion





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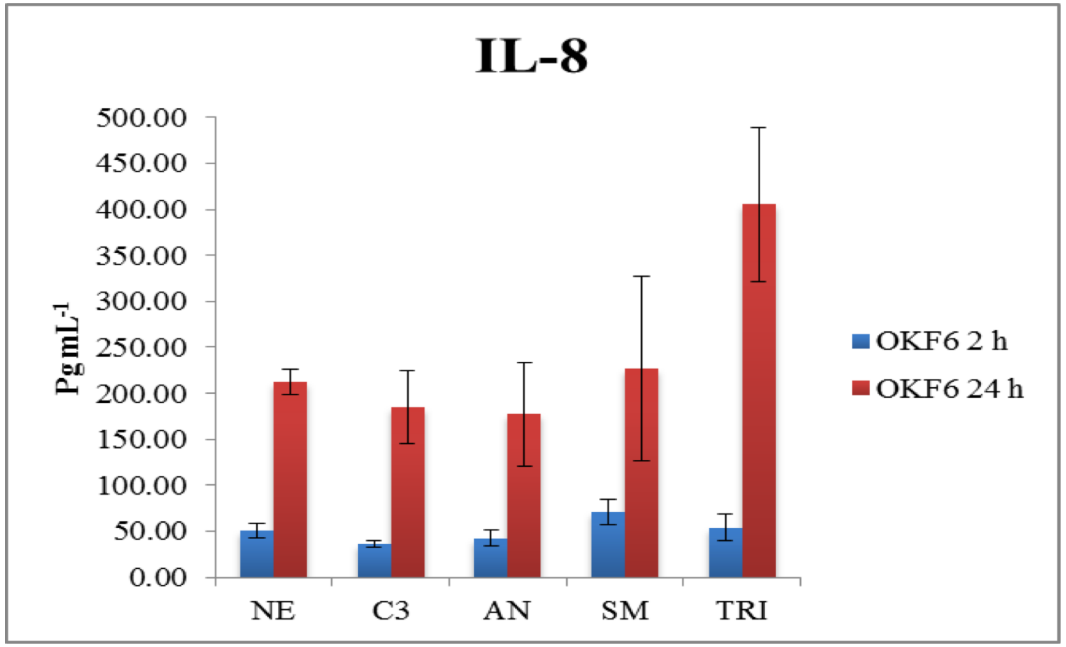

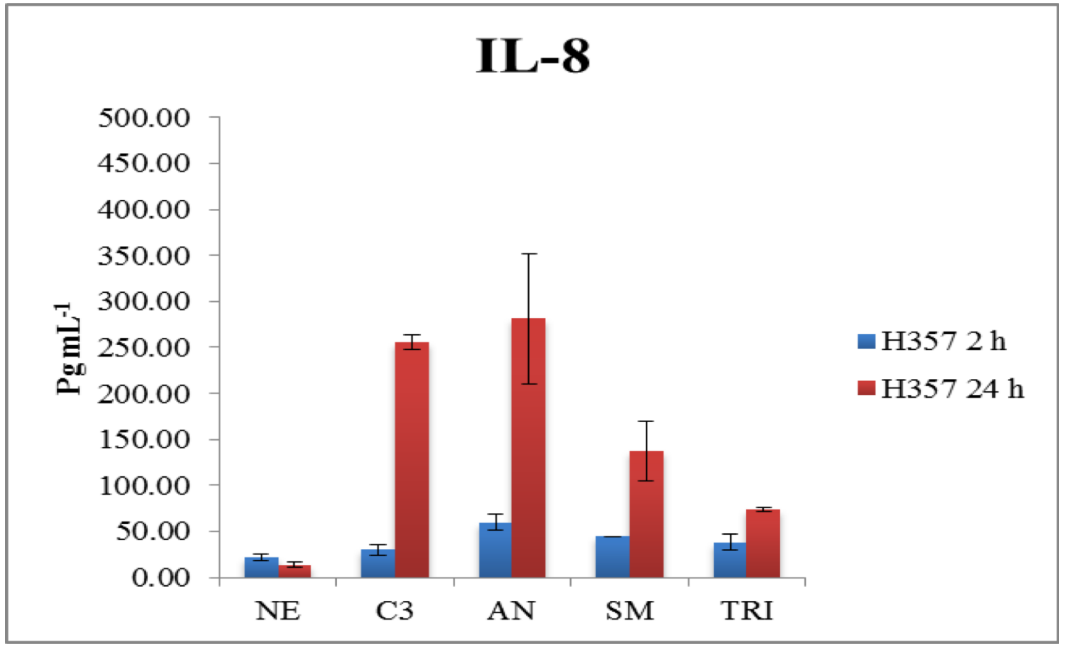

Conclusion

- Biofilm effluent promote oral carcinogenesis
  - *A. naeslundii* is a potential probiotic

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